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NASA TECH BRIEF

Manned Spacecraft Center

Digital-Coded Matrix System Simplifies Design and Construction of Flow Charts

The problem:

Experimental flow charts with block diagrams showing hardware and documentation flow are used in such technical areas as production engineering, quality control, procurement, manufacturing, reliability and testing. The conventional way of creating charts, i.e., drawing a preliminary chart on roll-size vellum, is time consuming, and requires numerous personnel and large work areas.

The solution:

A matrix system utilizing a unique digital code enables drawing the block diagrams with parallel blocks. Complete freedom is obtained in laying out the diagram, and it is possible to go directly from the matrix to the finished drawing. The system eliminates the need to rough out a diagram and greatly reduces the time involved.

How it's done:

The digital-coded matrix system is composed of functions listed vertically and related hardware listed horizontally. The digital code involves a sequence of three numbers: the first is the predecessor block, or the number of the block from which the flow is coming; the second indicates the block referred to by the particular sequence of numbers; and the third is the successor block, or the block to which the flow proceeds.

Each digital-coded number represents a block (or function) in the flow diagram. The intersection of the function with the hardware indicates the title and the particular piece of equipment for which the function is intended. For those functions which are not hardware oriented, the codes are to the immediate right of the ordinate. For blocks representing functions which are repetitive except for key words, the codes are to the left of the ordinate, under a column headed by the key word. The functions appear on the matrix in the sequence in which they occur in the diagram.

Although this system is designed for hardware oriented flow charts, it can be readily adapted for a variety of charts such as those used in computer programs.

Notes:

1. Transformation from matrix format to the drafted flow chart lends itself to automation. Matrix entries could be keypunched and processed to produce the final drawing. This system would be useful in city, state, and regional government planning and in the management of complex projects.
2. Requests for further information may be directed to:

   Technology Utilization Officer
   Manned Spacecraft Center, Code JM7
   Houston, Texas 77058
   Reference: TSP71-10086

Patent status:

No patent action is contemplated by NASA.

Source: Ernest O'Toole of
Martin Marietta Corp.
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